

Coastal Inlets Research Program



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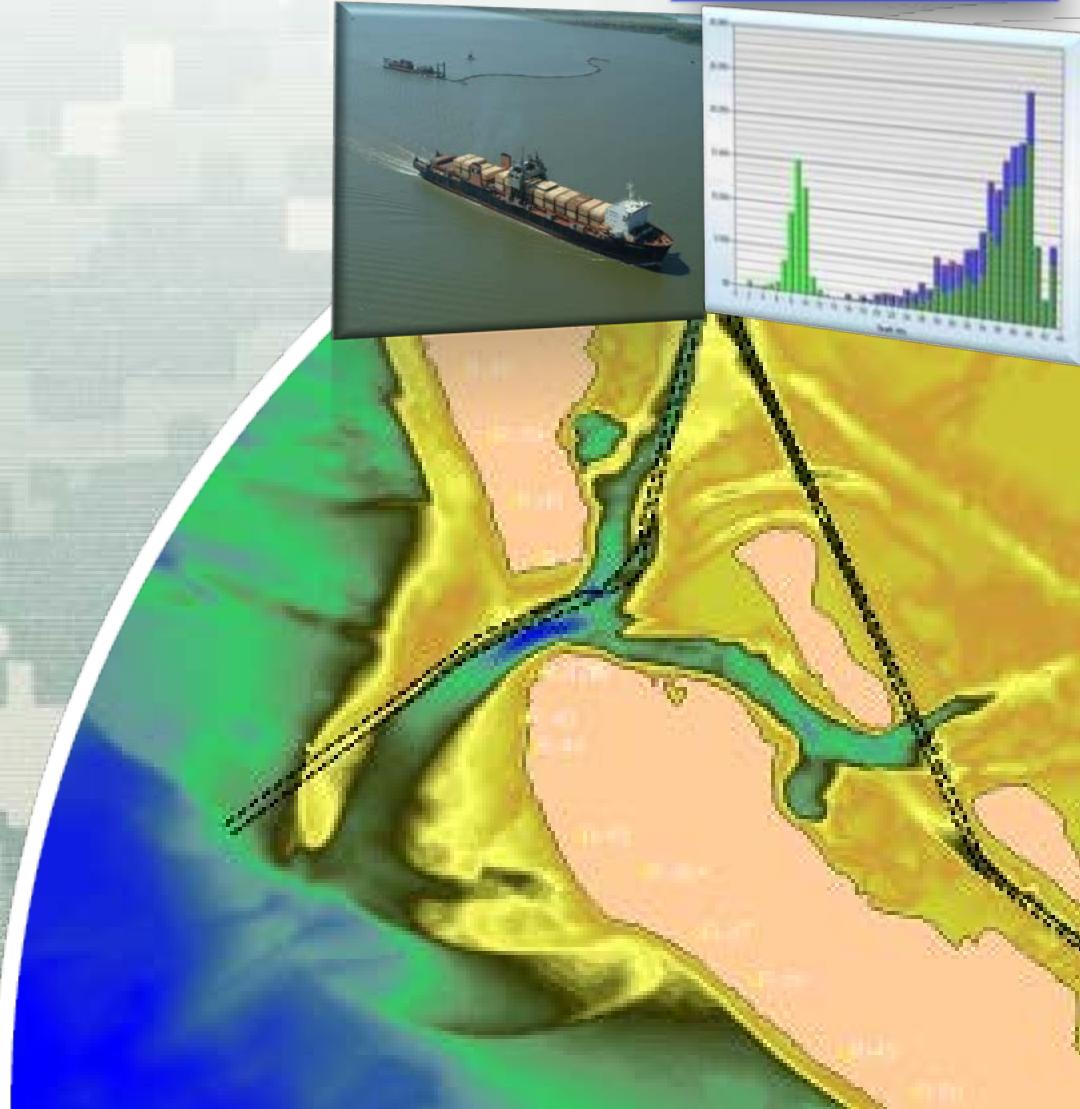
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Overview of Presentation

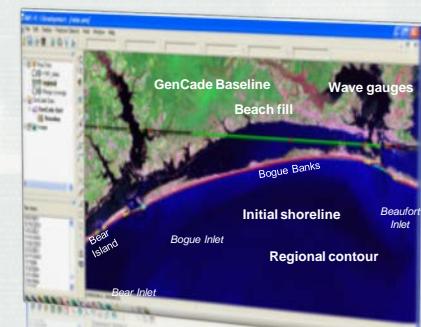
- Coastal Inlets Research Program
 - Mission
 - Technology and Products
- FY12 Activities - *Models in Surface-water Modeling System*
 - **Coastal Modeling System**
CMS-Wave, CMS-Flow *SoN 2008-N-6: Long-term Morph Chg*



PTM for CMS *Upgrade to operate with telescoping grid*

- **GenCade**

SoN 2008-N-6: Long-term Morphology Chg



Overview of Presentation (cont.)



WebTools

- CPT, CSMART

SoN 2009-N-8: Justification for Dredging



- Berm Planning Calculator

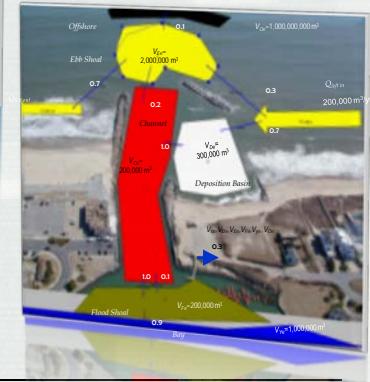
SoNs 2011-N-15b/19b: Nearshore Berms



- WaveNet

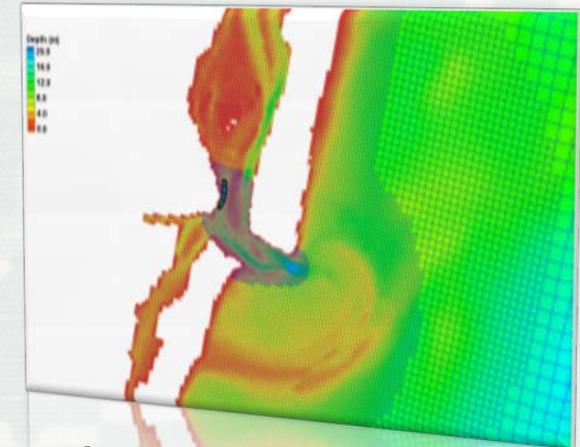
SoN 2011-N-10: Dynamic WebLink Environ

- FY13 Proposed Activities
 - Sea Level Rise Impacts on Coastal Navigation Projects *SoN 2012-N-11*
 - Automated Feature Extraction for Sediment Budgets *SoN 2012-N-15*
 - Validation Measurements *SoN 2009-N-5*



CIRP Mission

- Conduct R&D to reduce O&M costs at coastal navigation projects
 - Include inlets, entrances, ports, marinas, harbors, navigation structures, and adjacent beaches as influenced by metocean forcings.
- Develop tools to support O&M practice
 - Provide Districts tools for in-house PCs.
 - Tools to evaluate inlets, channels, structures, adjacent beaches, dredging and placement within a regional management practice.
- Transfer technology and products
 - Guidance documents, Workshops, models and tools, Web site, Wiki-pages, PC software, Web portals, Mobile device apps.



Coastal Inlets Research Program

Mission Areas

Tools and Models:

CMS, CPT, CSMART,

GenCade, Inlet Res Model,

RMAP, Shoaling Toolbox,

CMS pre/post processing tools

WaveNet, Nearshore

Berm Calculator

Tech Transfer:

Workshops, Website, Wiki,

Mobile apps, Video clips,

Webinars, TRs, TNs, JPs



R&D: *Berm migration, Mixed-grain sediment transport,*

Long-term morphology change, Sand sharing relationships for inlets

CIRP Work Units

Program Management and Technology Transfer

Julie Rosati, Mitch Brown

**Coastal
Modeling
System
(CMS)**

*Alex Sanchez
Honghai Li*

**Geomorphic
Evolution**

Tanya Beck

CIRP

Research & Development

**Inlet
Engineering
Toolbox**

*Ashley Frey
Julie Rosati*

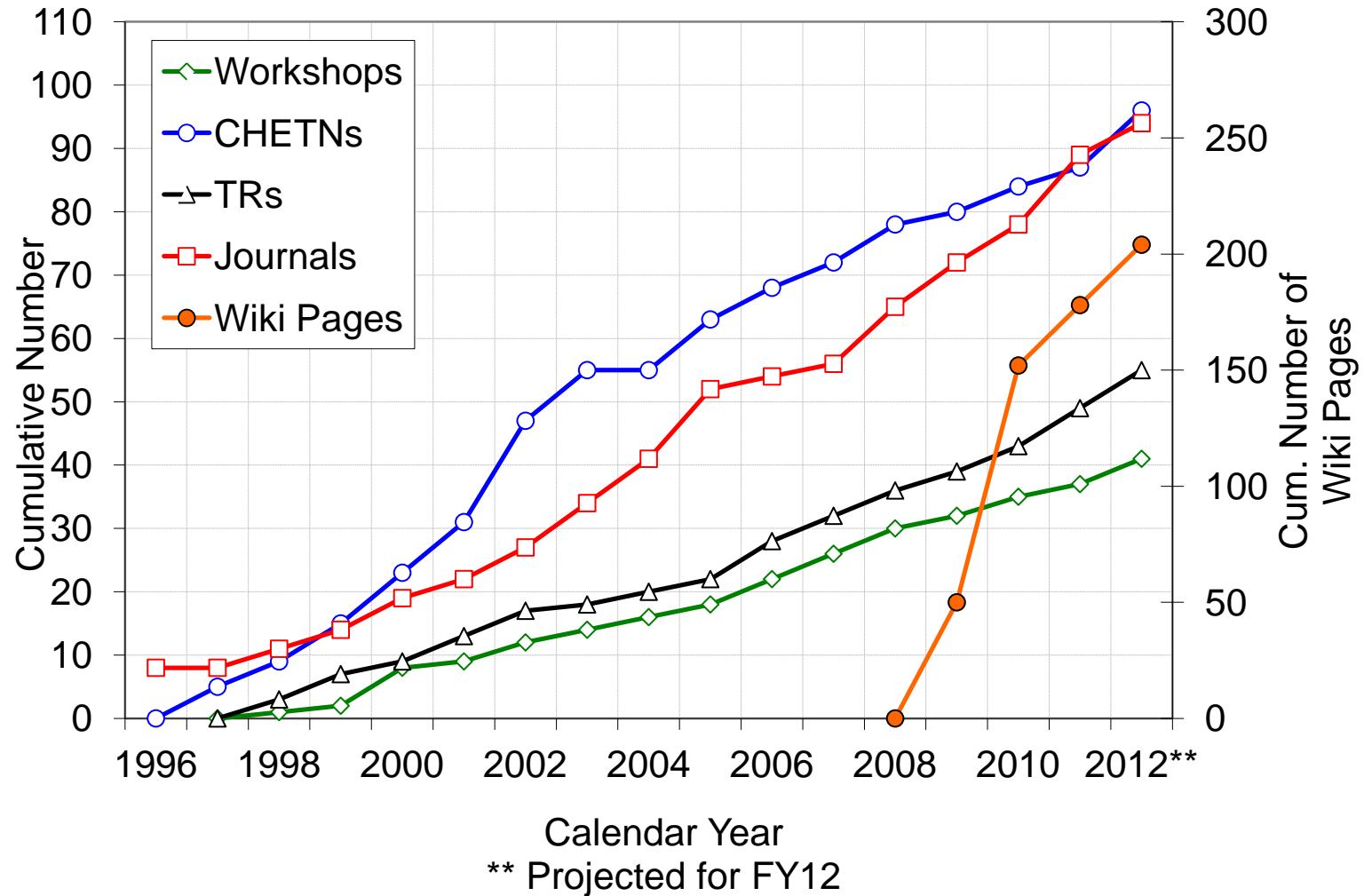
**Waves at
Navigation
Structures**

*Lihwa Lin
Zeki Demirbilek*

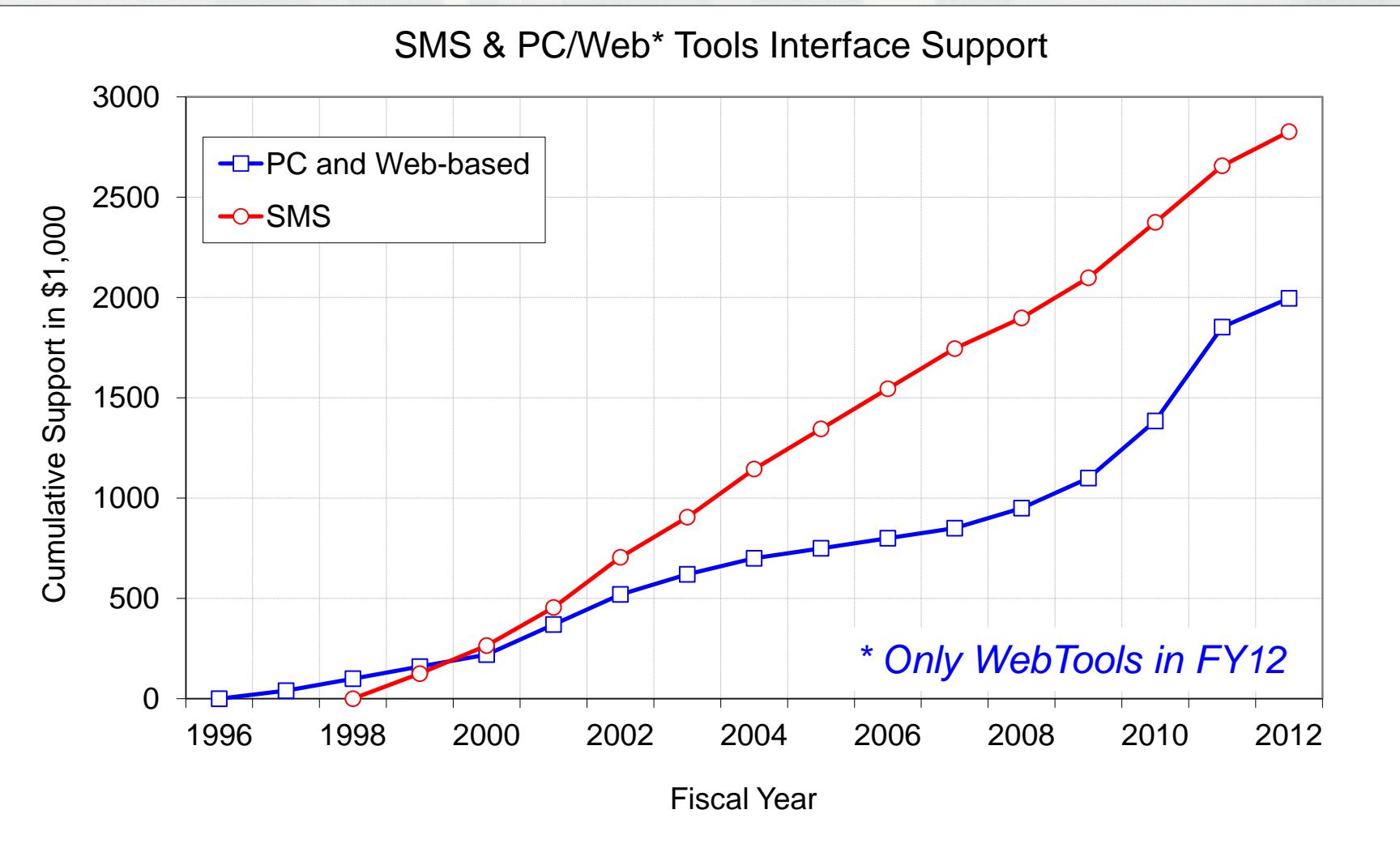
**Coastal
Navigation
Portfolio
Management**

Ned Mitchell

CIRP Publications and Workshops



Investment Chart



Workshops, Nov98-Aug12

E & W Coasts, Nov 1998	Avalon, NJ/Redondo Beach, CA	Recent developments in CIRP: ADCIRC & STWAVE
#1 – FSBPA, Feb 2000	St. Petersburg, FL	Hydrodynamic, sediment transport, and morphological change
#2 – FSBPA, Feb 2001	Orlando, FL	ADCIRC, STWAVE, & ADCIRC/STWAVE linkages
#3 – FSBPA, Jan 2002	Biloxi, MS	GIS for coastal and navigation projects
Jul 2002	Vicksburg, MS	Steel girder/plate/WaveDots
#4 – FSBPA, Feb 2003	Ponte Vedra Beach, FL	Hydro Steering Module and sediment transport/ morphology change
May 2003	Clearwater Beach, FL	CS03 Modeling Tidal Inlets
#5 – FSBPA, Feb 2004	Destin, FL	Incisor, groyne, marsh, and dredging, morphology change
Aug 2004	New York, NY	Calculating sediment transport/morphology change
#6 – FSBPA, Feb 2005	Baltimore, MD	Non-tidal inlet training and morphology change, channel infilling
Aug 2005	Sarasota, FL	Inlet Modeling System technology transfer workshop
#7 – FSBPA, Jan/Feb 2006		Modeling of waves, circulation, sediment transp. and morph. change

13 Years of Annual Workshops

40 Cumulative Workshops

3 Workshops (2 w/DOTS) and 3 Webinars in FY12

I: Beginning CMS and SMS (Jun 11-15, 1-3 pm CDT)

II: Advanced CMS (Jun 18-22, 1-3 pm CDT)

III: GenCade (Sep 11-13, 1-3 pm CDT)

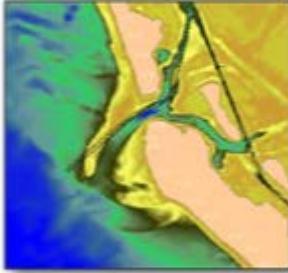
Register on CIRP Website

#12 FSBPA, Feb 2011	Jacksonville, FL	Modeling & Decision-Support for Coastal Inlets
Aug 2011	San Diego, CA	CMS&GenCade for Regional Sediment Management
#13 NAP, Mar 2012	Philadelphia, PA	Technology Transfer Workshop/Webinar
Jun (2), Sep 2012	Webinars	CMS and GenCade Webinars

Feedback from NAP Workshop

CIRP

Numerical Model Tools and Capabilities



Coastal Inlets Research Program

U.S. Army Engineer Research and Development Center
Coastal and Hydraulics Laboratory



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Coming Soon: Quick-Reference Summary of CIRP's WebTools

Coastal Inlets Research Program **BUILDING STRONG®**

numerical model tools and capabilities

Model	What does it do?	What are typical time scales and platforms?	Where has it been validated?	What are advantages?	What are limitations?	Where do I find info?	Who is the main POC?
JOSS-LD/2D Wave model or navigation vert/barrier; load & risk assessment; section- support	<ul style="list-style-type: none"> High-fidelity, advanced, most accurate model for short and long waves 1-10 km regions Wave-structure-ship interactions, ship wake Surf & swash zone waves (rip currents, runup/over-topping, infra gravity & tsunamis) 	<ul style="list-style-type: none"> 2D wave conditions run with rectangular grids in projects Can be used with one grid or grids for each project alternative Runs on PC, Linux, and HPCs (supercomputers) Hours to a week 	<ul style="list-style-type: none"> 20+ sites including coastal inlets, harbors, ports, flood control structures, and reefs 	<ul style="list-style-type: none"> Physics & process based; no empiricism Only 2D model for nonlinear shallow-water waves Ideal for ports/harbors/marines, & design/chaos of infrastructure 	<ul style="list-style-type: none"> Need expertise to run Time-consuming Not necessary for all coastal problems No winds No unstructured-grid capability 	<ul style="list-style-type: none"> CIRP, NavDex, TDR, SWIMS websites Knowledge Hub (KH) 	 Dr. Zekri Demirbilek
CMS-Flow 2D, depth-integrated	<ul style="list-style-type: none"> Tidal flow, wave-induced currents, sediment transport, and morphology change Integrated with CMS-Wave 	<ul style="list-style-type: none"> Runs on multi-core desktop machines Typical simulation lengths of several months to years 	<ul style="list-style-type: none"> 20+ sites including coastal inlets, estuaries and beaches 	<ul style="list-style-type: none"> Integrated system Robust and fast Flexible Cartesian meshes SWMS interface User-friendly 	<ul style="list-style-type: none"> Depth integrated No boundary fitting capability No swash zone or cross-shore sand transport (yet) 	 Alex Sanchez	 Dr. Liwei Lin
CMS-Wave 2D, depth-integrated	<ul style="list-style-type: none"> Full-plane spectral wave generation-transformation Integrated with CMS-Flow Designed for inlet applications 	<ul style="list-style-type: none"> Runs on PC in SMS, DOS Typical simulation lengths of several months to years 	<ul style="list-style-type: none"> 20+ sites: US East and West coasts, Gulf of Mexico 5+ laboratory and theoretical studies 	<ul style="list-style-type: none"> Efficient SWMS interface Theoretical-based wave diffraction, reflection Includes structure-wave interactions 	<ul style="list-style-type: none"> Empirical wave breaking formula Structured grid 	 Ashley Fries	 CIRP website
GeoCode (2D regional beach and inlet shoal evolution model)	<ul style="list-style-type: none"> Can represent coastal structures, beach fills, dredging and placement Includes Inlet Reservoir Model* to account for inlet shoal and channel evolution <p>*Also available in PC version</p>	<ul style="list-style-type: none"> Runs on PC in SMS Years to multiple decades Wave conditions representing 1-10 years 	<ul style="list-style-type: none"> 5+ sites: Ossawaway Bay, NC; Sargent Beach, TN; St. Johns County, FL; Point Lookout, NY 	<ul style="list-style-type: none"> User-friendly, easy to learn Conceptual model – fast grid creation and set up Integrates cumulative projects Fast 	<ul style="list-style-type: none"> Empirically-based sand transport Explicit solution scheme (solution stability) Constrained by standard 1-line model assumptions 	 Dr. Tahireh Larkay (DOER), Honghai Li (CIRP), Zekri Demirbilek (CIRP & DOER)	 CHL
PTM (particle tracking model, for 2D/3D hydro models)	<ul style="list-style-type: none"> Joint DOER-CIRP product Coupled to CMS by CIRP Predicts particle transport pathways and fate SMS-based interface 	<ul style="list-style-type: none"> Accepts input from CMS and other hydro and wave models Runs on desktop PCs and HPCs (super-computers) Seconds to hours 	<ul style="list-style-type: none"> Basic V&V completed Detailed V&V studies in progress 	<ul style="list-style-type: none"> Fast and efficient Flexible; not tied to any hydro or wave model SMS interface connects to flow and wave models 	<ul style="list-style-type: none"> Not designed for sediment transport calculations Semi empirical formulas Too many particles can slow runtimes 	 CHL	 CIRP, DOER websites



Technology & Products*

Surface Water
Modeling System

CMS

- CMS-Wave
- CMS-Flow
- PTM



GenCade
Bouss-2D

Web-Tools and Guidance

CPT and CSMART

CHANNEL
SHOALING
TOOLBOX

CIRP Website
& Wiki



Inlets  *online*

INLETS DATABASE
Section 111

Toolbox
Berms  *online*

Nearshore Berm
MetOpenDat. *Berm*
Calculator
WaveNet

Mobile Device
Applications

CPT-LITE



CIRP WEBSITE



PC Tools

Inlet
Reservoir
Model

RMAP

SBAS-PC



Technology & Products*

Surface Water
Modeling System

CMS

- CMS-Wave
- CMS-Flow
- PTM



GenCade

COUSS-2D

COUSS-3D

COUSS-4D

COUSS-5D

COUSS-6D

COUSS-7D

COUSS-8D

COUSS-9D

COUSS-10D

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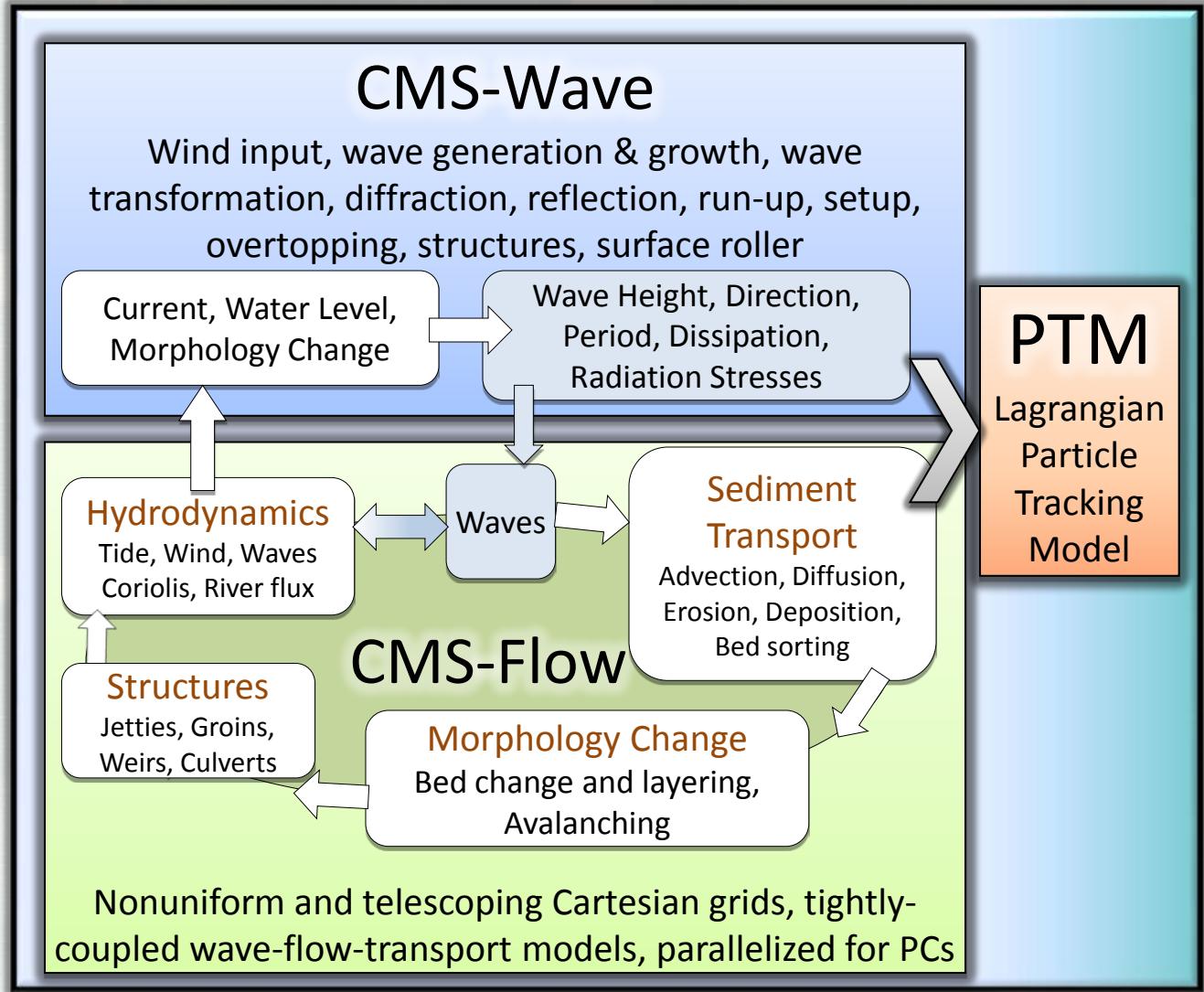
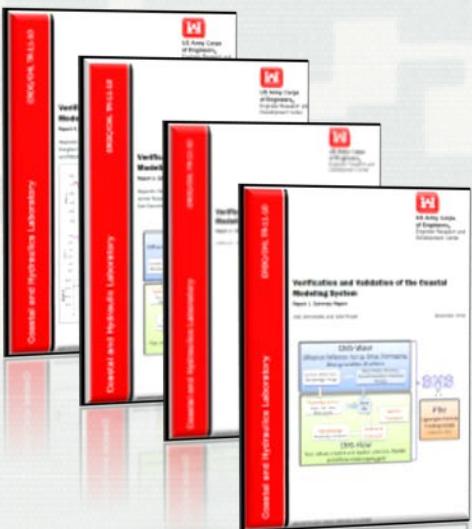
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COUSS-417

Coastal Modeling System (CMS)

What is the CMS?

Integrated wave, current, and morphology change model in the Surface-water Modeling System (SMS).



Coastal Modeling System (cont.)

Why CMS?

Operational at 12 Districts

Practice-oriented: *1 day simulation ~ 1 hr on PC!*

Integrated system for wave-current-morphology modeling

4 Verification & Validation reports document theoretical, laboratory, and real-world applications

Approved by H&H CoP for use in USACE applications

Recent Tech Transfer activities

Feb 2011: Jacksonville, FL

Sep 2011: San Diego, CA

Nov 2011: New York District, NY (DOTS)

Feb 2012: Baltimore District, MD (DOTS)

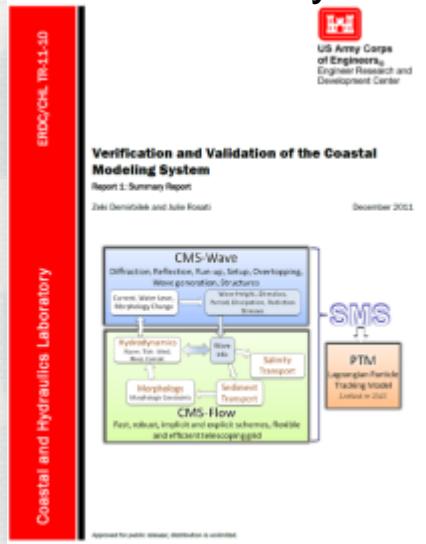
Mar 2012: Philadelphia, PA



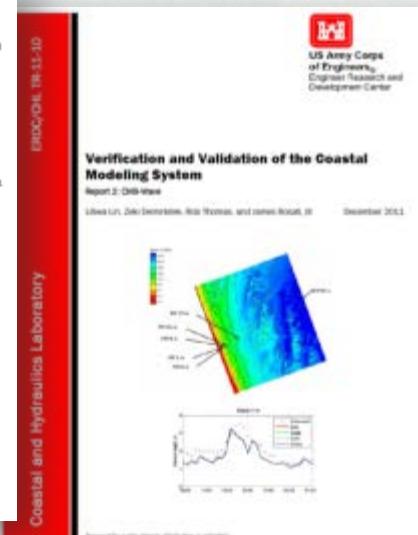
Coastal Modeling System Accomplishments: Four V&V Reports Published!

- Documents goodness-of-fit statistics for CMS applications:
 - 9 Analytical Cases
 - 13 Laboratory Cases
 - 21 Field Cases
- V&V Study established data bank for coastal wave, flow, and sediment transport model validation

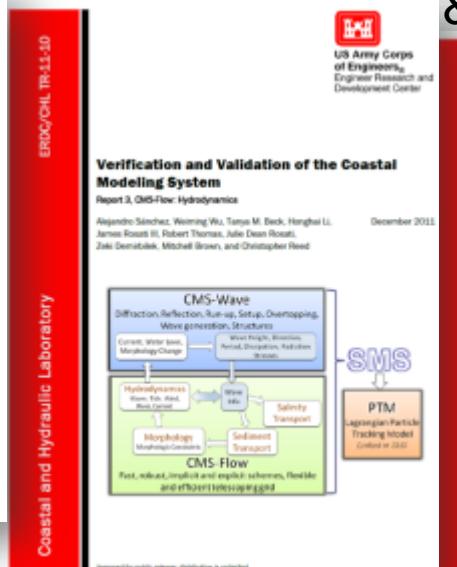
1:Summary



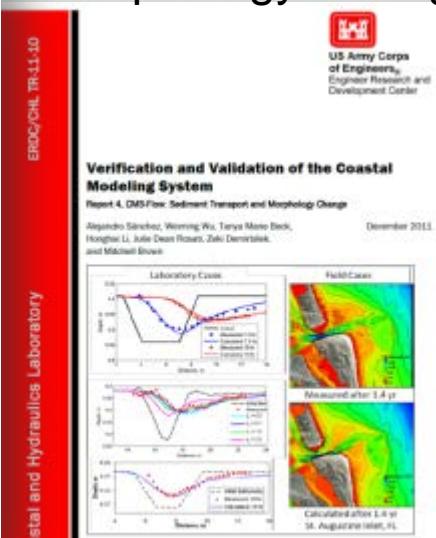
2: Waves



3: Flow



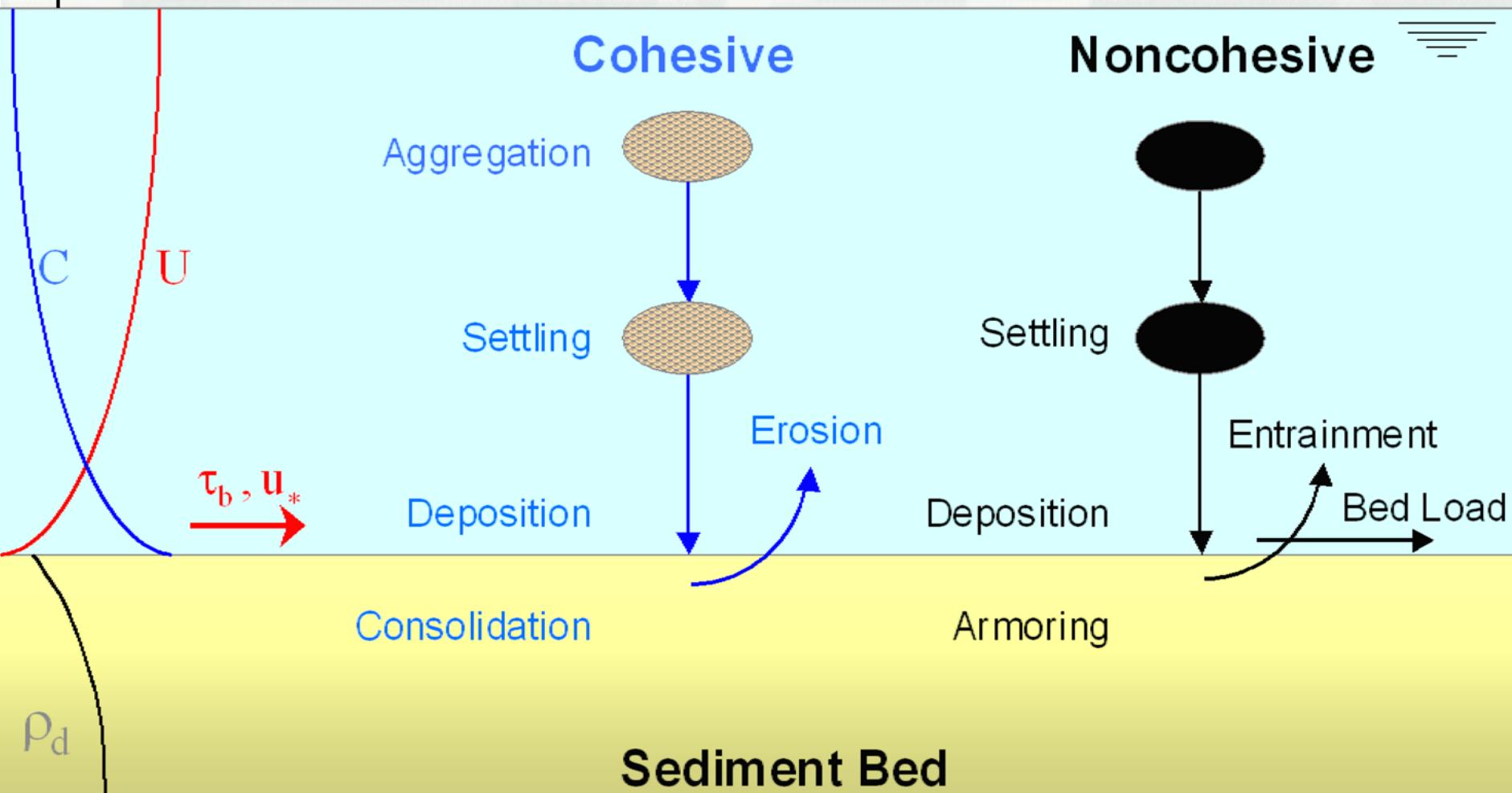
4:Sediment Transport & Morphology Change



FY12 Activities: Implementation of MIXSED into CMS

What is MIXSED?

Sediment bed model that enables representation of multiple size classes of cohesive and non-cohesive sediment in coastal projects

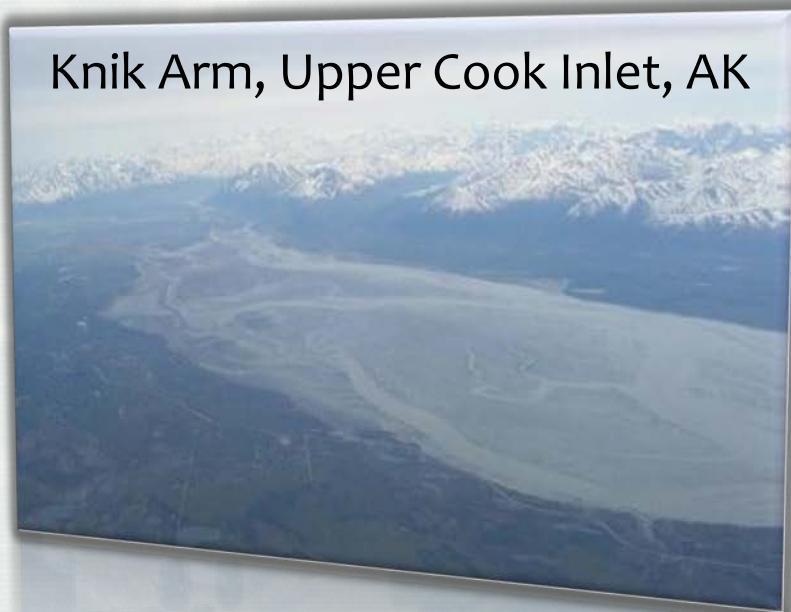


FY12 Activities: Capabilities MIXSED Adds to CMS

Simulates erosion and transport of mixed cohesive and non-cohesive sediment under **combined wave & currents**

- Nearshore & offshore O&M placement of mixed cohesive/non-cohesive sediments
- Sediment transport of mixed sediments in inlets, harbors, bays
- Examples:
 - Mobile Bay, AL
 - Galveston Bay, TX
 - Buzzards Bay, MA
 - Upper Cook Inlet, AK

Knik Arm, Upper Cook Inlet, AK

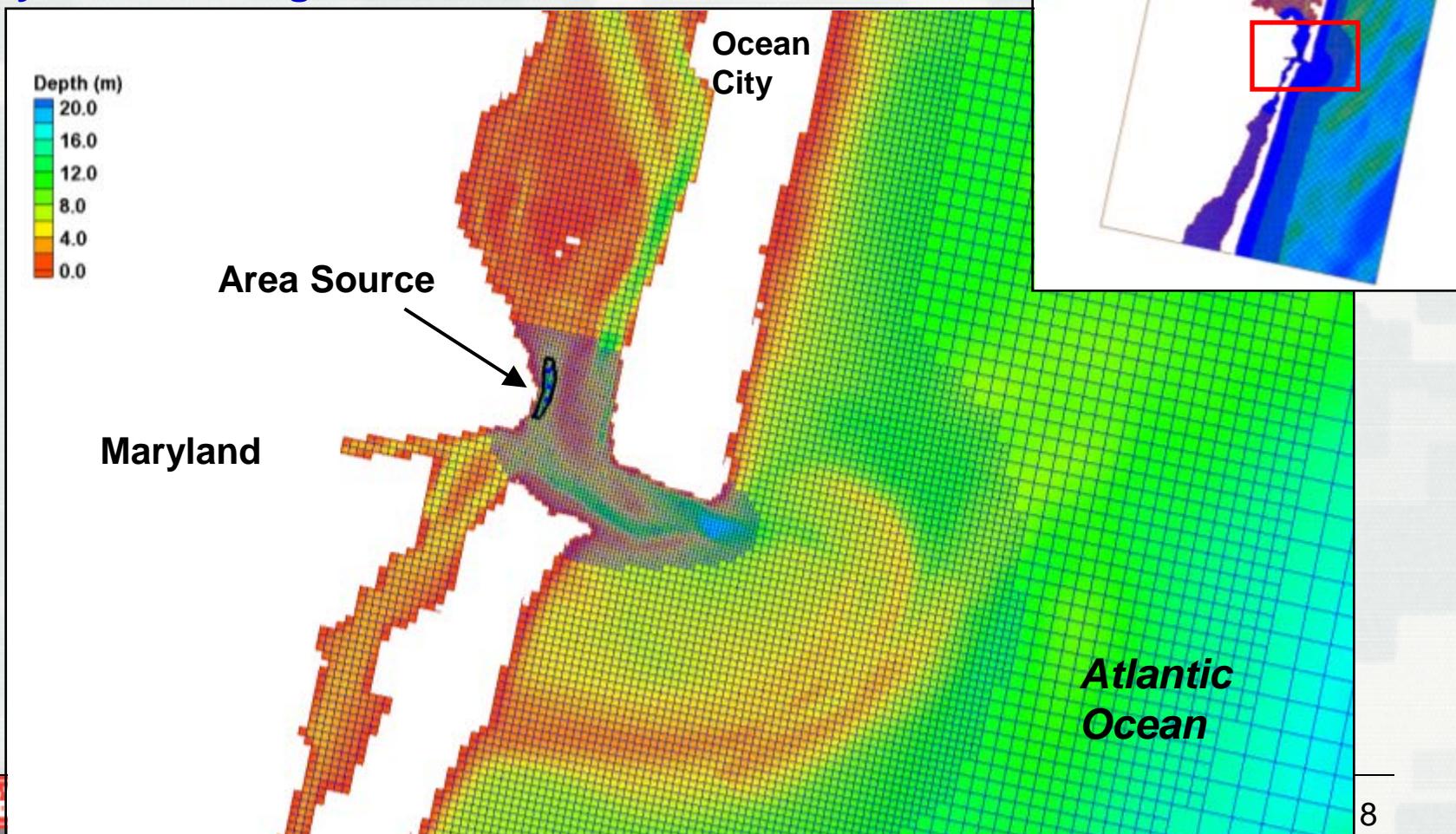


FY12 Accomplishments: PTM Upgrade for CMS Telescoping Grids

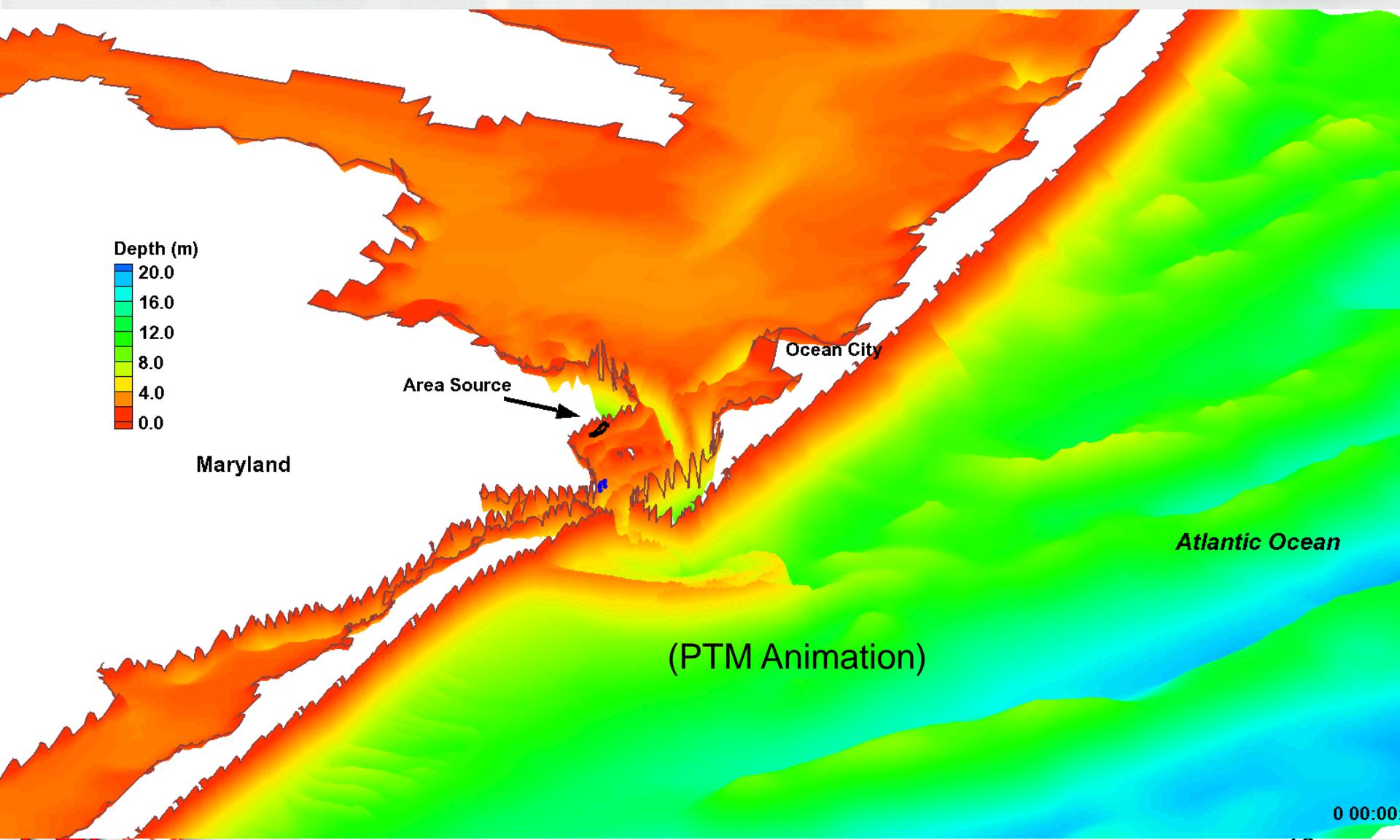
Particles released from deep scour hole

Particle size released (silt): 0.02 mm

Hydrodynamic forcing: Tide and waves



FY12 Accomplishments: PTM Upgrade for CMS Telescoping Grids

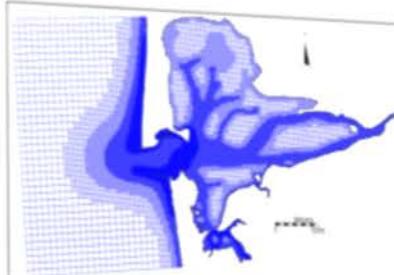


FY12 Accomplishments: CMS: Theory & User's Guide

ERDC/CHL TR-12-X

Coastal Modeling System, Report 5: Theory, Numerical Implementation and User Guide for CMS Flow and Sediment Transport Model

Alejandro Sánchez, Werning Wu, Julie Rosati, Zeki Demirel, DRAFT April 2012
Tanya Beck, Honghai Li, and Mitch Brown



Coastal & Hydraulics Laboratory

CMS-Flow and Sediment Transport: Theory, Numerical Implementation & User's Guide

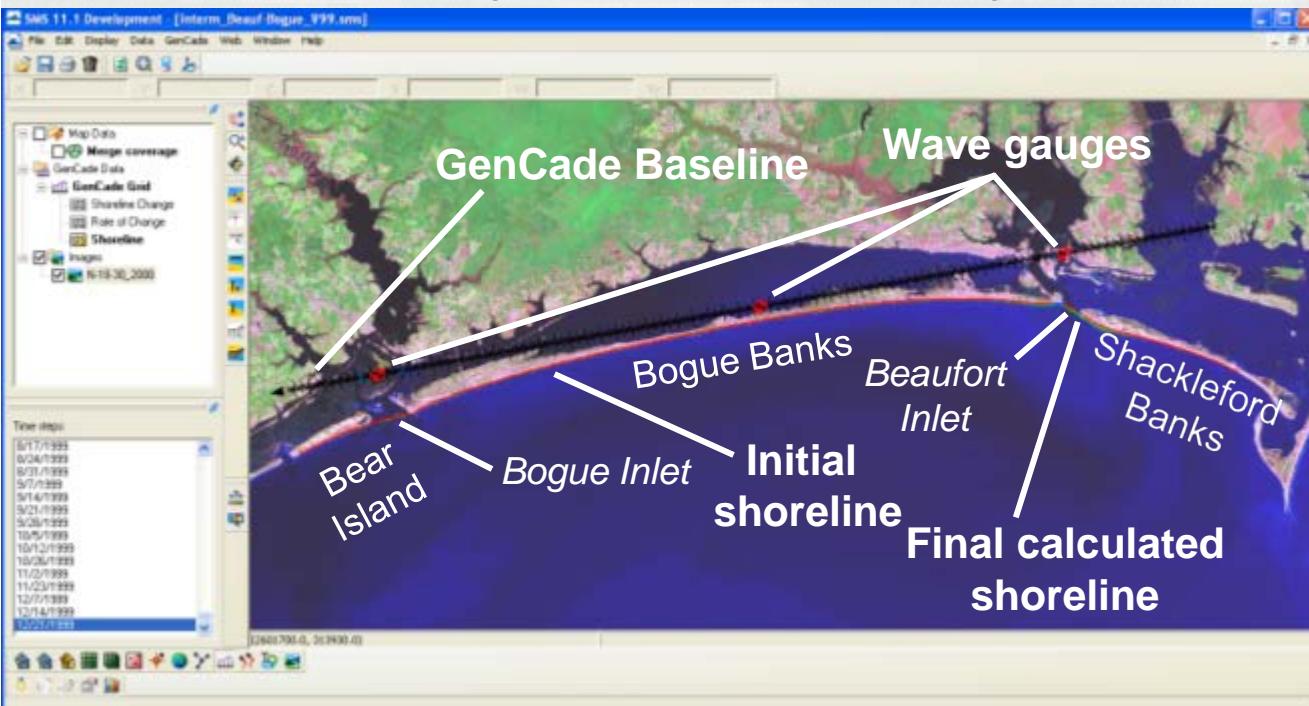
- Theory
 - Hydrodynamics
 - Salinity
 - Sediment Transport
- Numerical Methods
- User's Guide
- Appendices: Input and Output Files

Visit the
CMS/PTM
Booth!



What is GenCade?

- Integrated GENESIS and Cascade models for shoreline change and sand sharing with inlet channels and shoals.
- Connects inlets, navigation channels, ebb and flood shoals, beaches, and engineering activities in a regional framework.
- Decision-making support for planning, operation, and engineering.



Second GenCade
Workshop, Aug '11





GenCade (cont.)



Why GenCade?

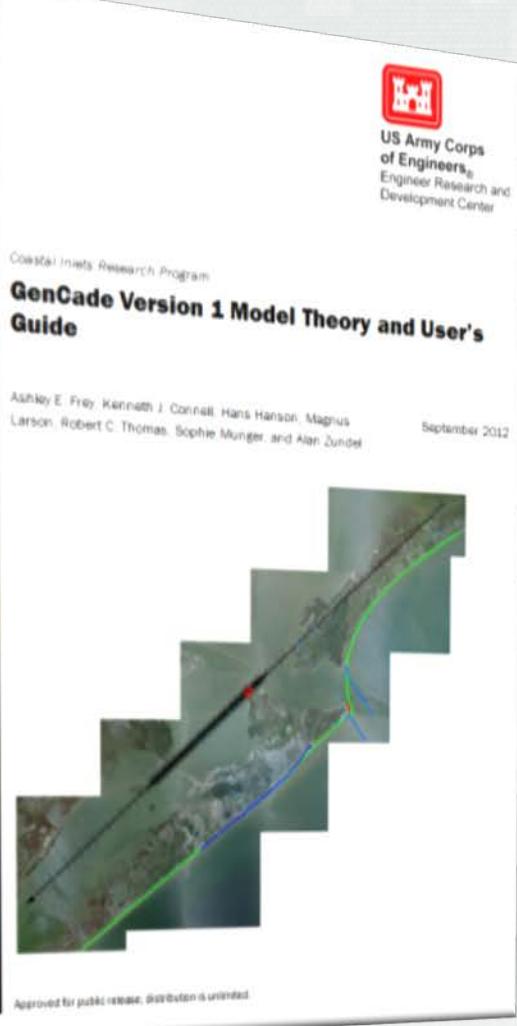
- Sediment storage and transfer (bypassing, back-passing)
- Navigation channel maintenance
- Multiple interacting inlet dredging & placements on beaches
- Cumulative impacts
- Sources & sinks (shoal dredging and beach nourishment)
- Compatibility with previous calculations
- In SMS 11.1; PC, user-friendly interface for engineers & scientists



GenCade FY12 Accomplishments

ERDC/CHL/TR-12-xx

Coastal and Hydraulics Laboratory



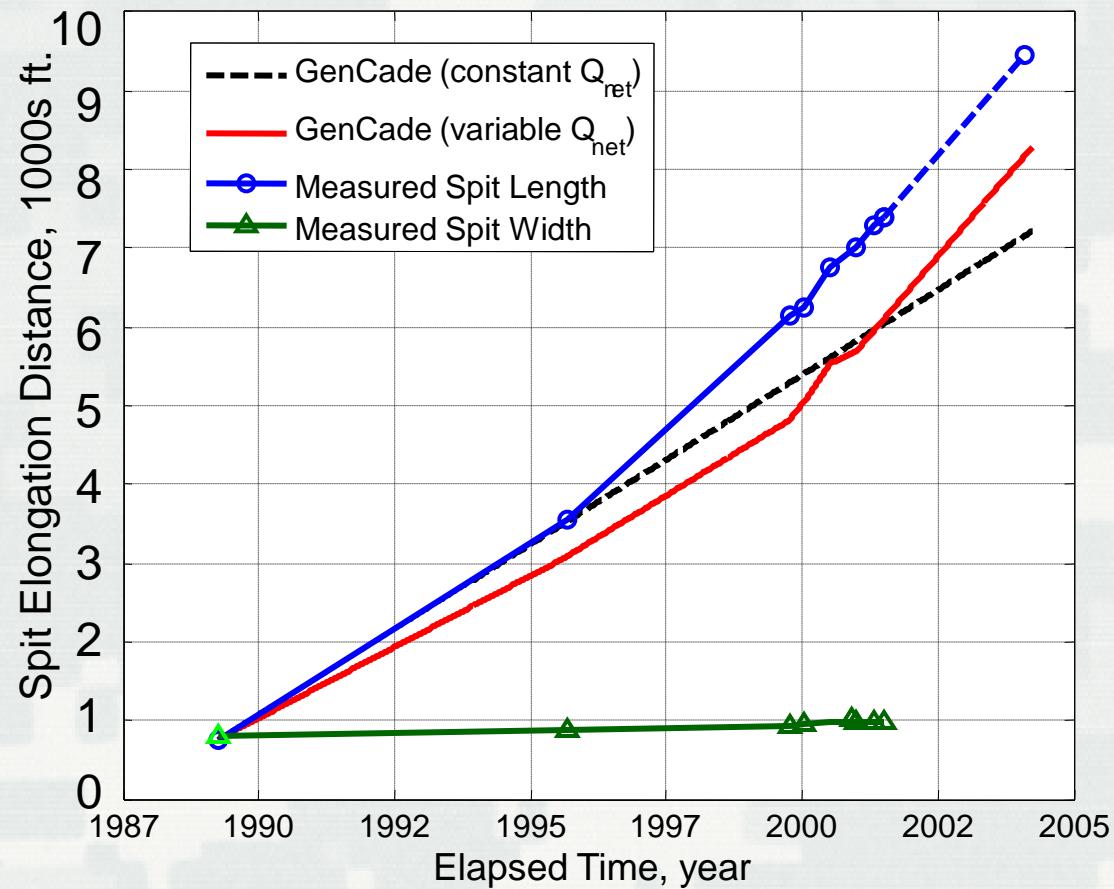
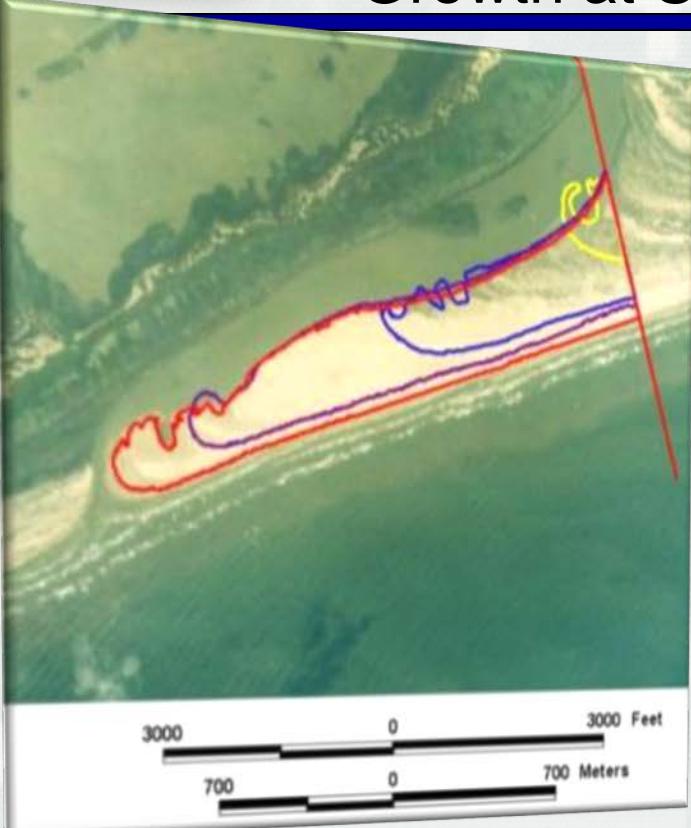
GenCade Model Theory & User's Guide

- Theory
- Validation
- Interface & User's Guide
 - Input & output files
 - Conceptual model
 - Visualization
 - Calibration & developing alternatives
- Application to Long Island, NY



(GenCade Animation)

Classic Groin Response: Cape May, NJ



Statements of Need

Need long-term morphologic evolution predictors
Tracking Number 2008-N-6

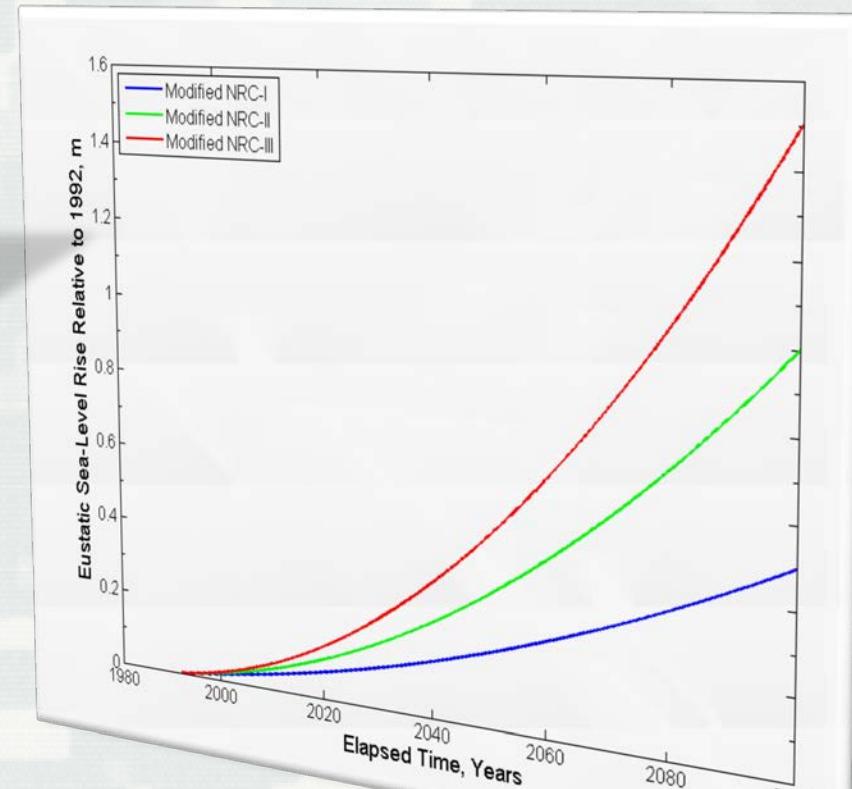


Incorporating Sea Level Change (SLC) into GenCade Calculations*

- Incorporate USACE (2011) methods for range in SLC as GenCade input
- Add change in sea level into GenCade calculations



Engineering and planning incorporating SLC can be investigated with GenCade

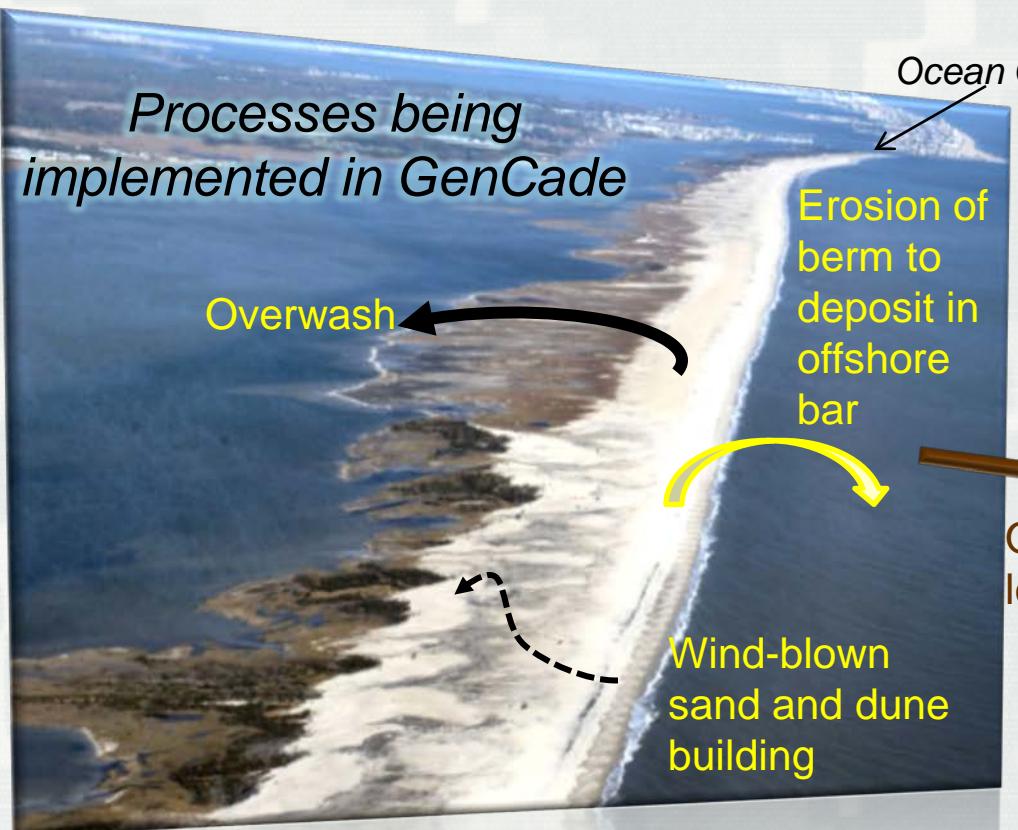


*SLC is presently considered in GenCade applications in an ad hoc manner

Adopted by USACE (2011) (EC 1165-2-212)
Based on updates to NRC 1987 equation

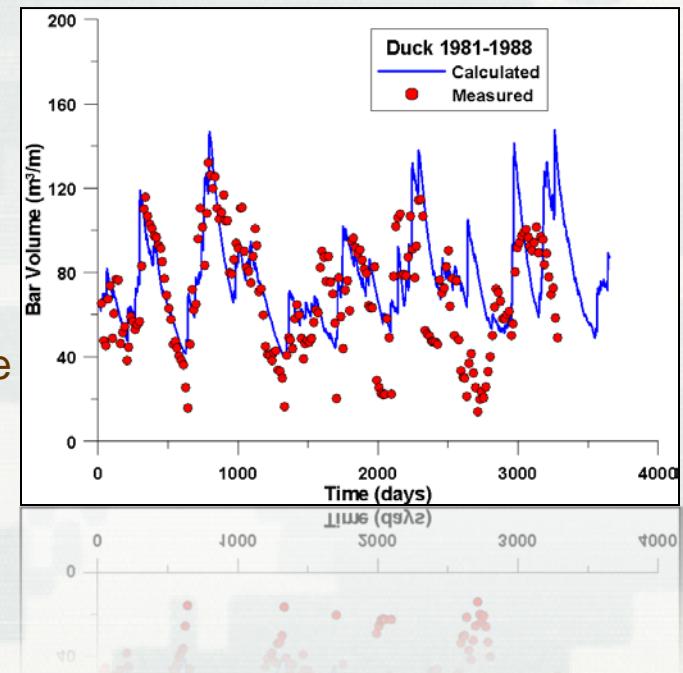


Incorporating Cross-Shore Transport in GenCade



Assateague Island, MD

Example comparison between measured and calculated bar volume, Duck, NC





GenCade FY12-FY13 Activities

CMS-Wave

Wind input, wave generation & growth, wave transformation, diffraction, reflection, run-up, setup, overtopping, structures, surface roller



Option for GenCade to accept forcing from an external wave model

GenCade

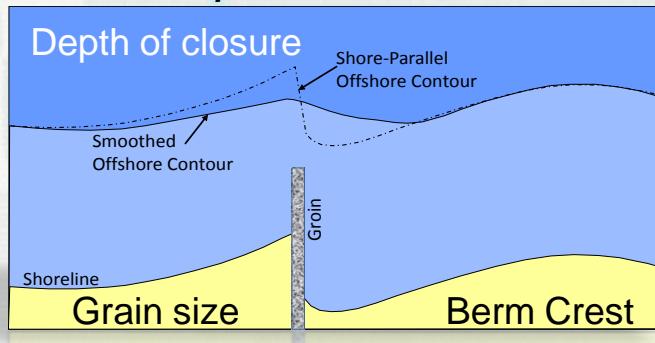


SBAS Arc10



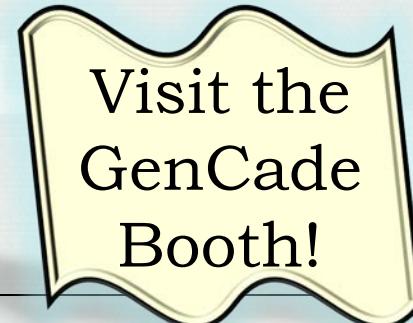
GenCade output used as input to create an SBAS Calculated Sediment Budget

Variable alongshore parameters



Wiki-TN: Standard Methodology for Calibration and Validation

- Statistical toolkit
- Recommended statistics for acceptable Cal/Val
- Standard, unified approach



Visit the
GenCade
Booth!



Technology & Products*

Surface Water
Modeling System

Web-Tools and Guidance

Mobile Device
Applications

CMS

- CMS-Wave
- CMS-Flow
- PTM
- DOER

GenCade

OUSS-2D

**CPT and
CSMART**

CHANNEL
SHOALING
TOOLBOX

CIRP Website

& Wiki  Find us on Facebook

Inlets  **online**

Berms  **online** 

INLETS DATABASE

Section 111
Toolbox

*Nearshore Berm
Calculator*

*MetOcnDat:
WaveNet*

IRM
Webtool

PC Tools

**Inlet
Reservoir
Model**

Channel Portfolio Tool (CPT)

What is CPT?

Web-based application that relates navigable depths to cargo most vulnerable to shoaling. Allows for detailed, reach-level analysis as well as regional and national summaries of the **waterborne transportation systems** supported by Corps navigation projects.

The screenshot shows the CHL (Coastal and Hydraulics Laboratory) website. The main menu includes Home, Projects, Publications, R&D Applications, Software, Data, Contact, and Search. A sidebar on the left lists various navigation categories such as Research Programs, Products/Services, Facilities, Organization (Branches), Events Calendar, EXPERTISE (Coastal Structures, Conditions, Data Collection, Dredging, Erosion Control, Estuaries, Fish Passage, Flood Control, Groundwater, Harbors, Hydraulic Structures, Levees, Navigation, Rivers, Soils/Sediments, Warfighter Support, Watersheds, Waves). The main content area features a chart titled "Cumulative Depth vs. Container Dimensions Report 2008" and a text box describing the CPT's purpose. A red box highlights the "Channel Portfolio Tool (CPT)" section.

<https://cpt.usace.army.mil>

CPT uses data provided by the Waterborne Commerce Statistics Center (WCSC), and is available via the OMBIL portal.

Statements of Need

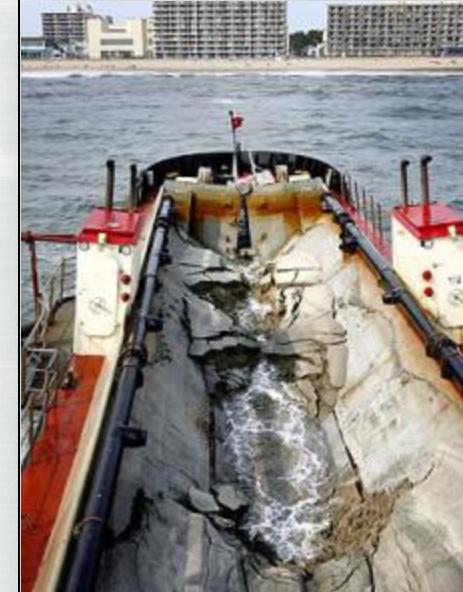
Improved Justification for and Prioritization of Annual Maintenance Dredging Investments
Tracking Number 2009-N-8

The screenshot shows the O&M Business portal. A red arrow points from the previous CPT screenshot to this one. The main menu includes Home and Other. On the left, there is a sidebar with "Step 1: Please select a category below to change the options at the right." Below this are several categories: All Business, Navigation, Locks, Dredging, Channel Portfolio Tool, Hydropower, Recreation, Estuaries, Sedimentology, Environmental Compliance, Flood Risk Management, Water Supply, Safety & Operational Health. The "Channel Portfolio Tool" option is highlighted with a red oval.

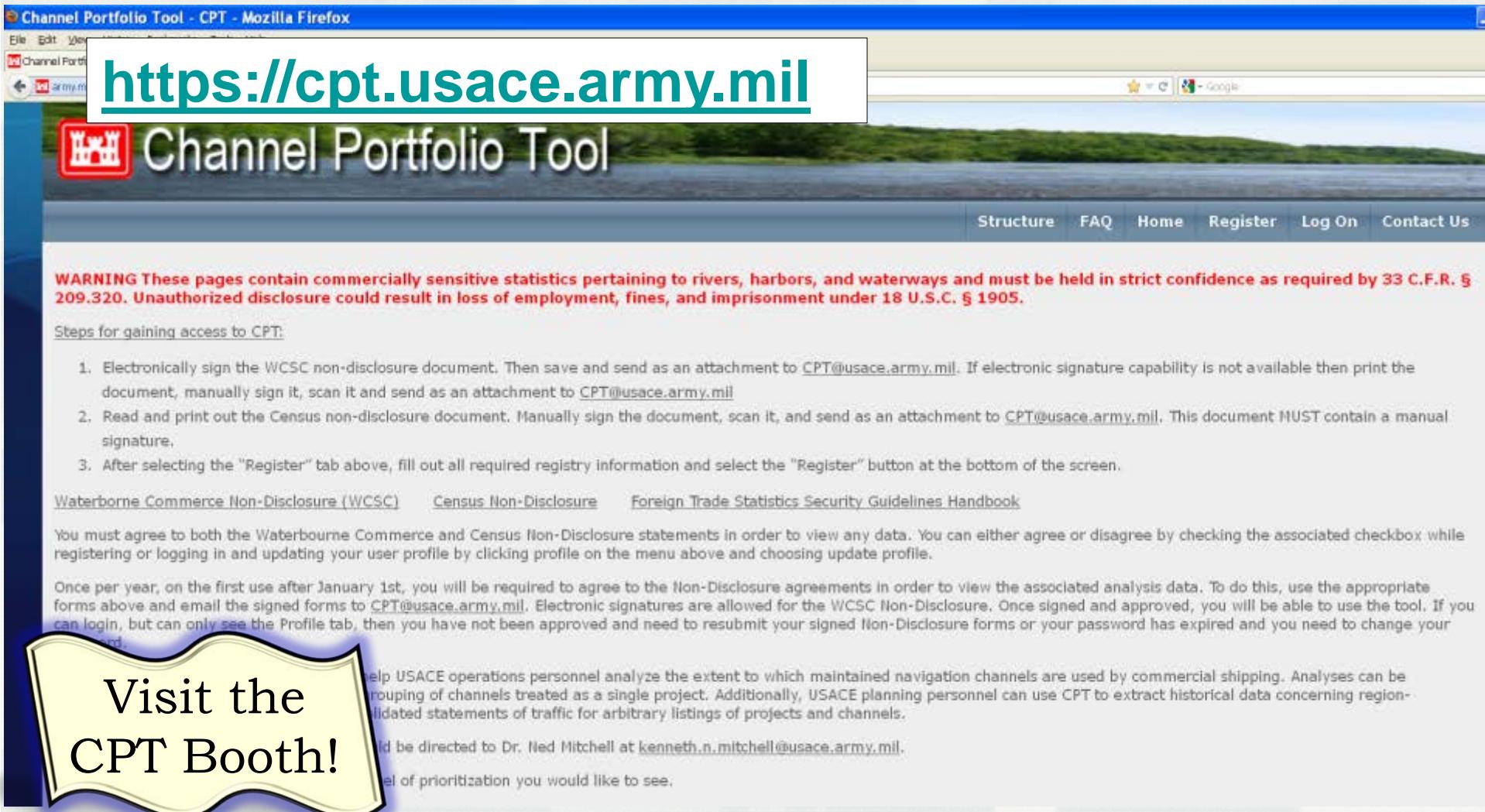
Channel Portfolio Tool (cont.)

Why CPT?

- Navigation project managers need consistent, objective data to justify funding for O&M dredging requests.
- OMB has indicated that improved O&M justification is a precondition for increased outlays from the Harbor Maintenance Trust Fund (HMTF).
- CPT conducts the data processing and filtering necessary for system-level analysis and performance evaluation.



Channel Portfolio Tool (CPT)



The screenshot shows a web browser window for the CPT website. The address bar displays the URL <https://cpt.usace.army.mil>. The page title is "Channel Portfolio Tool". A banner at the top of the page contains the text: "WARNING These pages contain commercially sensitive statistics pertaining to rivers, harbors, and waterways and must be held in strict confidence as required by 33 C.F.R. § 209.320. Unauthorized disclosure could result in loss of employment, fines, and imprisonment under 18 U.S.C. § 1905." Below the banner, there is a section titled "Steps for gaining access to CPT:" with three numbered steps. At the bottom of the page, there are links to "Waterborne Commerce Non-Disclosure (WCSC)", "Census Non-Disclosure", and "Foreign Trade Statistics Security Guidelines Handbook". A large callout box on the left side of the page says "Visit the CPT Booth!".

Channel Portfolio Tool - CPT - Mozilla Firefox

File Edit View
Channel Portf...
Army.mil

<https://cpt.usace.army.mil>

Google

Channel Portfolio Tool

Structure FAQ Home Register Log On Contact Us

WARNING These pages contain commercially sensitive statistics pertaining to rivers, harbors, and waterways and must be held in strict confidence as required by 33 C.F.R. § 209.320. Unauthorized disclosure could result in loss of employment, fines, and imprisonment under 18 U.S.C. § 1905.

Steps for gaining access to CPT:

1. Electronically sign the WCSC non-disclosure document. Then save and send as an attachment to CPT@usace.army.mil. If electronic signature capability is not available then print the document, manually sign it, scan it and send as an attachment to CPT@usace.army.mil.
2. Read and print out the Census non-disclosure document. Manually sign the document, scan it, and send as an attachment to CPT@usace.army.mil. This document MUST contain a manual signature.
3. After selecting the "Register" tab above, fill out all required registry information and select the "Register" button at the bottom of the screen.

[Waterborne Commerce Non-Disclosure \(WCSC\)](#) [Census Non-Disclosure](#) [Foreign Trade Statistics Security Guidelines Handbook](#)

You must agree to both the Waterbourne Commerce and Census Non-Disclosure statements in order to view any data. You can either agree or disagree by checking the associated checkbox while registering or logging in and updating your user profile by clicking profile on the menu above and choosing update profile.

Once per year, on the first use after January 1st, you will be required to agree to the Non-Disclosure agreements in order to view the associated analysis data. To do this, use the appropriate forms above and email the signed forms to CPT@usace.army.mil. Electronic signatures are allowed for the WCSC Non-Disclosure. Once signed and approved, you will be able to use the tool. If you can login, but can only see the Profile tab, then you have not been approved and need to resubmit your signed Non-Disclosure forms or your password has expired and you need to change your password.

Help USACE operations personnel analyze the extent to which maintained navigation channels are used by commercial shipping. Analyses can be performed on a regional level or by channel. The CPT can group channels into a single project. Additionally, USACE planning personnel can use CPT to extract historical data concerning regional traffic patterns and validate statements of traffic for arbitrary listings of projects and channels.

Questions regarding the CPT should be directed to Dr. Ned Mitchell at kenneth.n.mitchell@usace.army.mil.

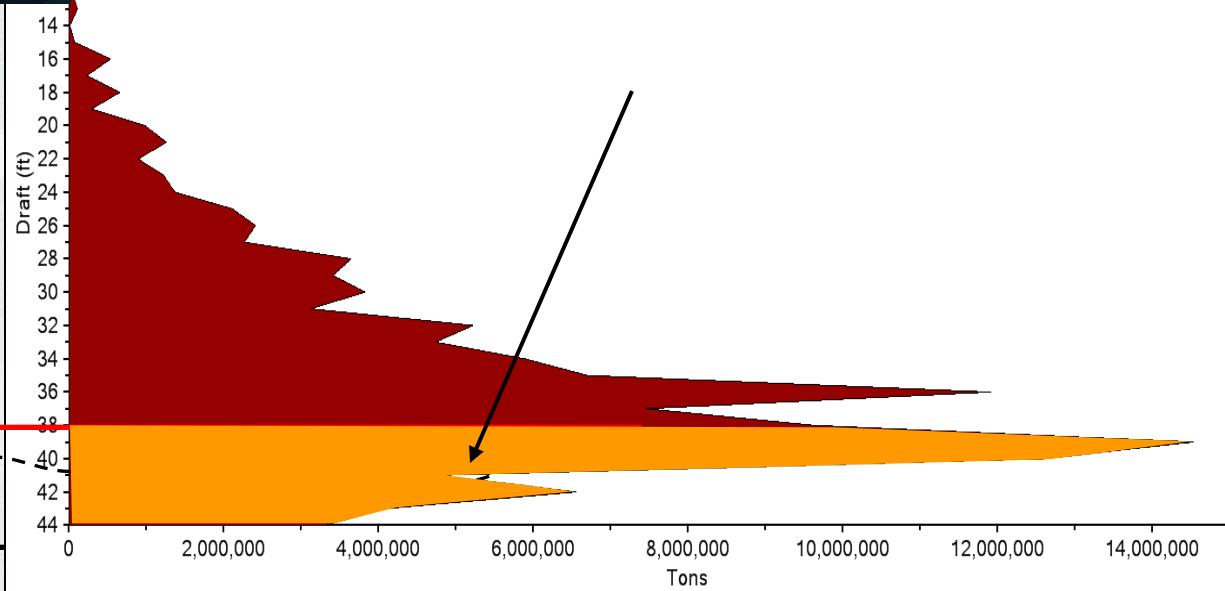
Would you like to see a different level of prioritization you would like to see?

Visit the CPT Booth!

Depth-Utilization Analysis



CPT tabulates the historical rates of shoal-vulnerable tonnage transiting navigation channels and uses the respective quantities as a basis for prioritizing O&M dredging jobs.



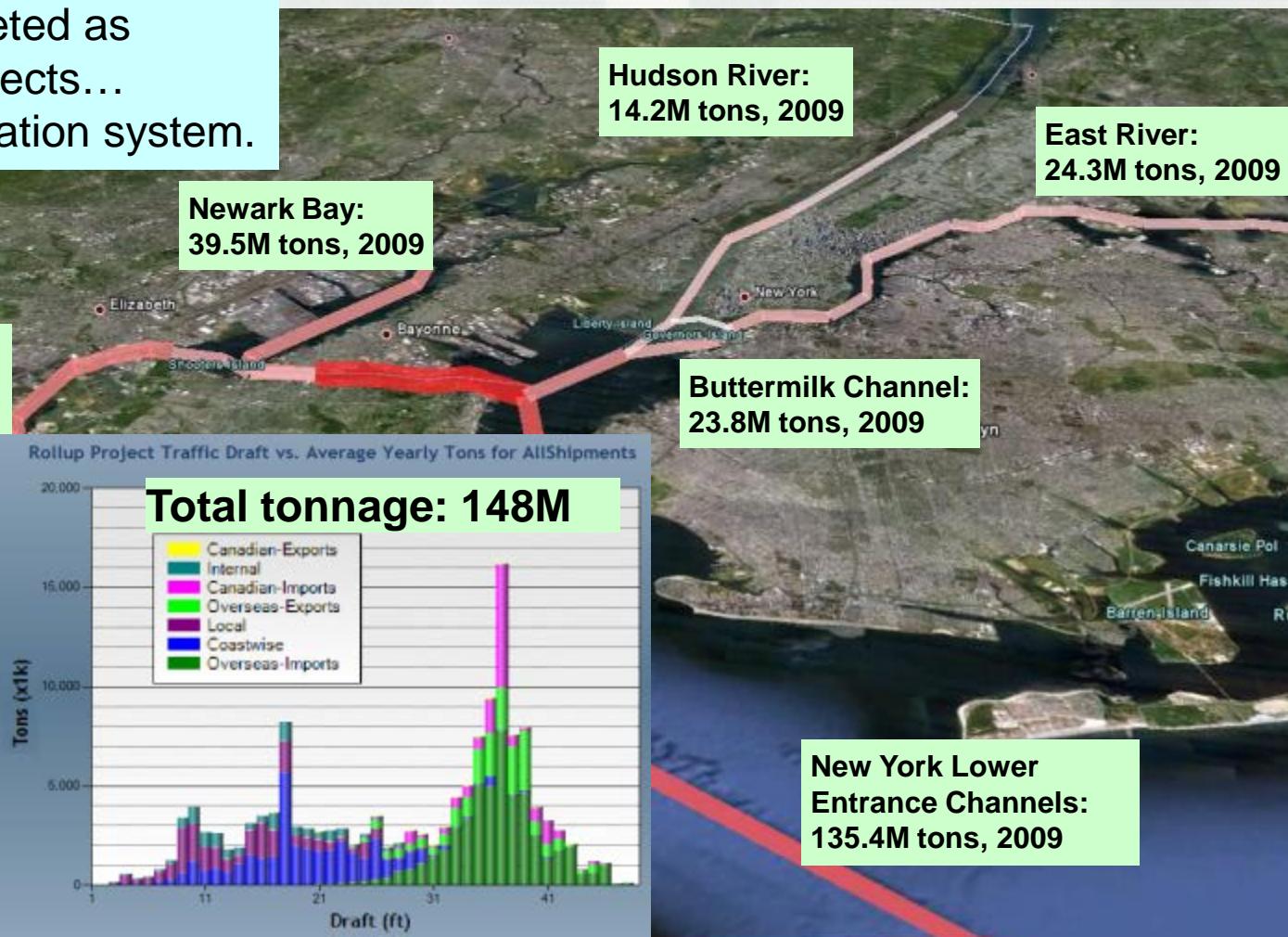
Visualization with CPT

WARNING This page contains commercially sensitive statistics pertaining to rivers, harbors, and waterways and must be held in strict confidence as required by 33 C.F.R. § 209.320. Unauthorized disclosure could result in loss of employment, fines, and imprisonment under 18 U.S.C. § 1905.



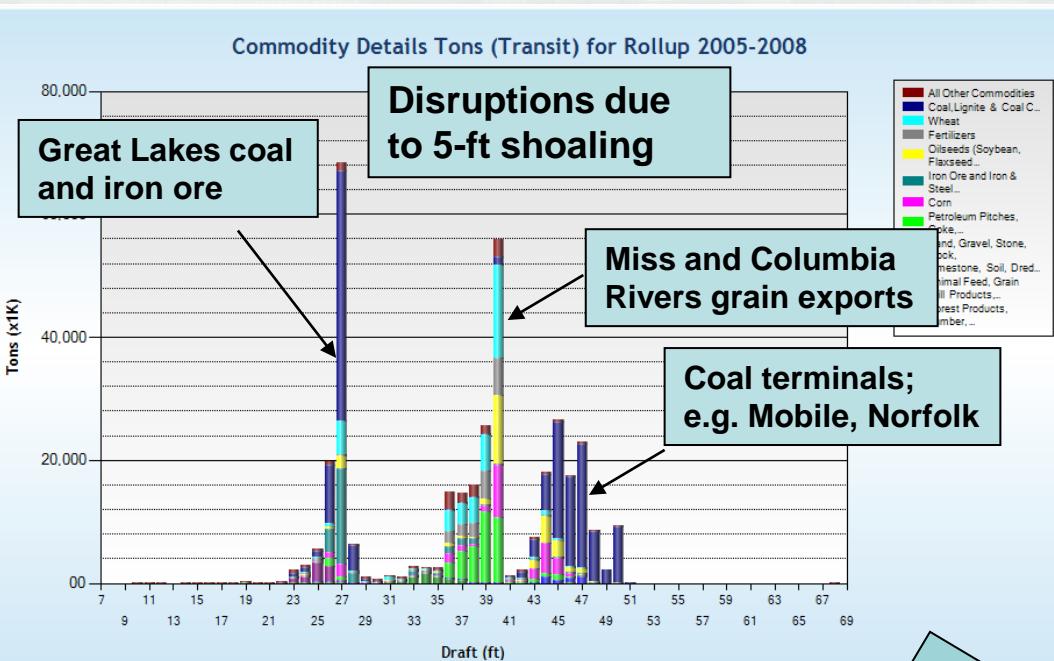
CPT and Navigation Systems

New York Harbor: budgeted as separate navigation projects... yet functions as a navigation system.



CPT is helping to ensure that Project O&M budgeting considers channel depth-utilization, cargo types, and system interdependencies (i.e. condition of other projects!).

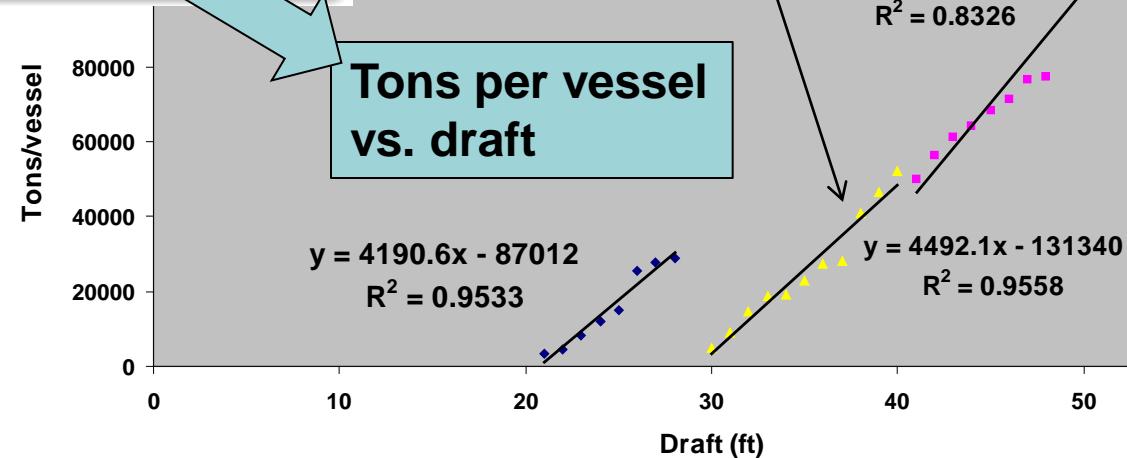
Quantifying Impacts of Shoaling



- Scalable approach for quickly estimating cargo that must be light-loaded due to shoaling conditions.
- Slopes of trend lines indicate the average amount of cargo that must be removed from each vessel in order to reduce vessel draft by 1-ft.

4,500 tons/vessel/ft of depth

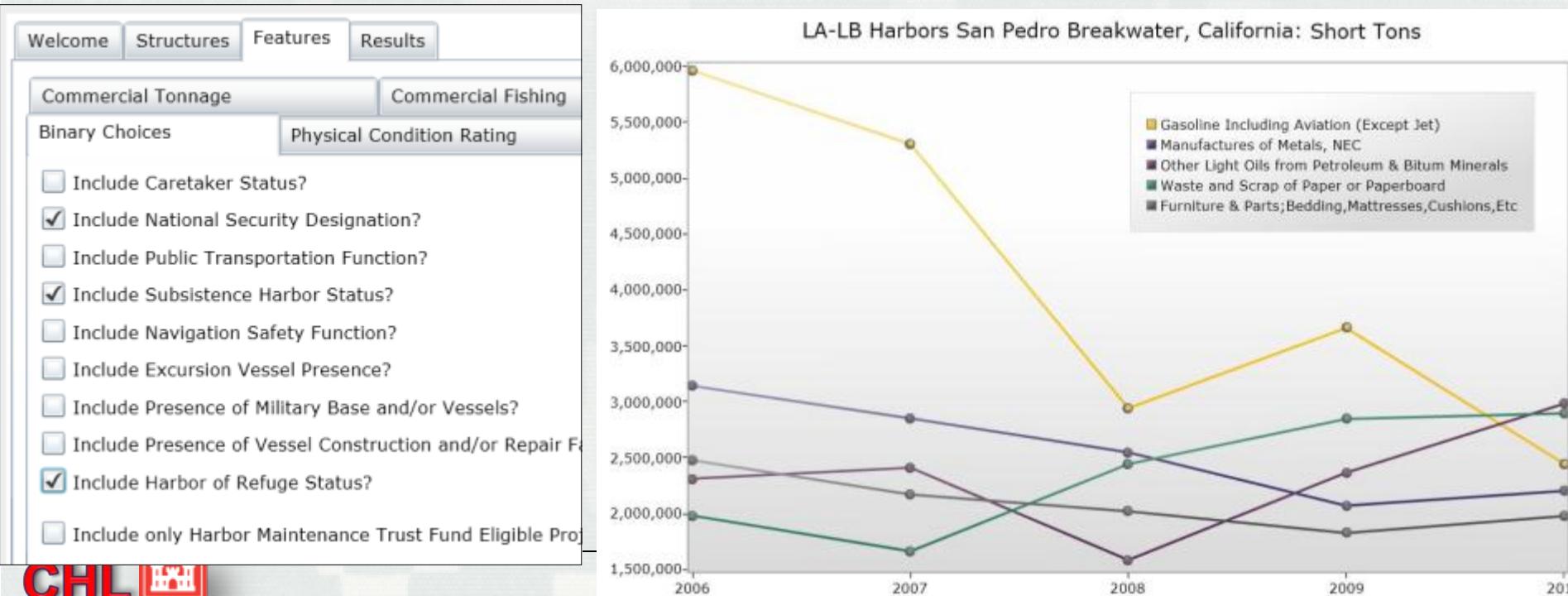
- Approach can be extended to total annual cargo disruptions, number of required additional voyages, and ultimately increased shipping costs.



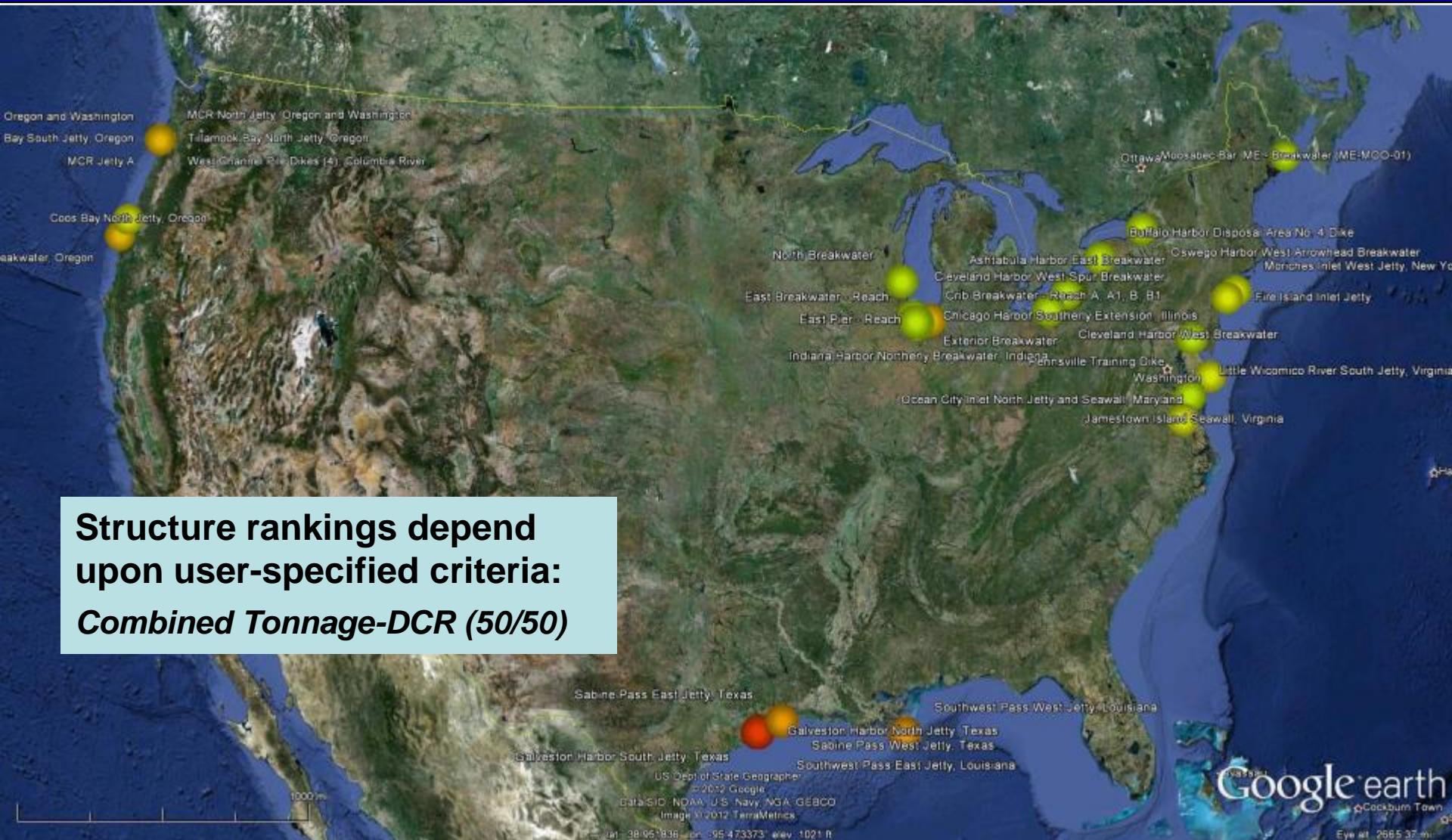
What is CSMART?

Web-based, Silverlight application that prioritizes coastal structures according to user-specified criteria and weightings on metrics such as condition rating, commercial tonnage, fish landings, and cruise and ferry passengers. Allows local, regional, and national queries and comparisons.

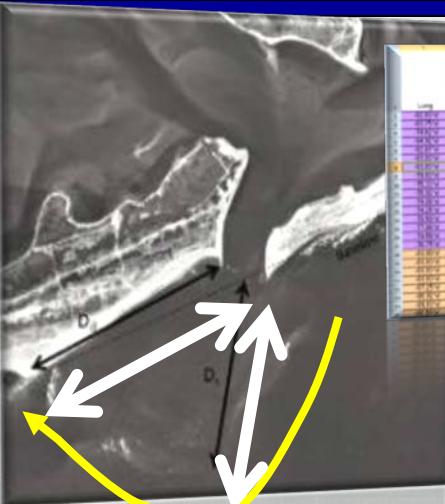
<https://itlgis01.usace.army.mil/CPT/Silverlight/CSMART>



Structure Prioritization via CSMART



**Structure rankings depend
upon user-specified criteria:
*Combined Tonnage-DCR (50/50)***



Federal Inlets Database



Nearshore Berm Calculator

Inlets Online



Berms Online



Inlet Reservoir Model (Web-based Version)



Inlets and Berms Online Databases

to Common Web Platform

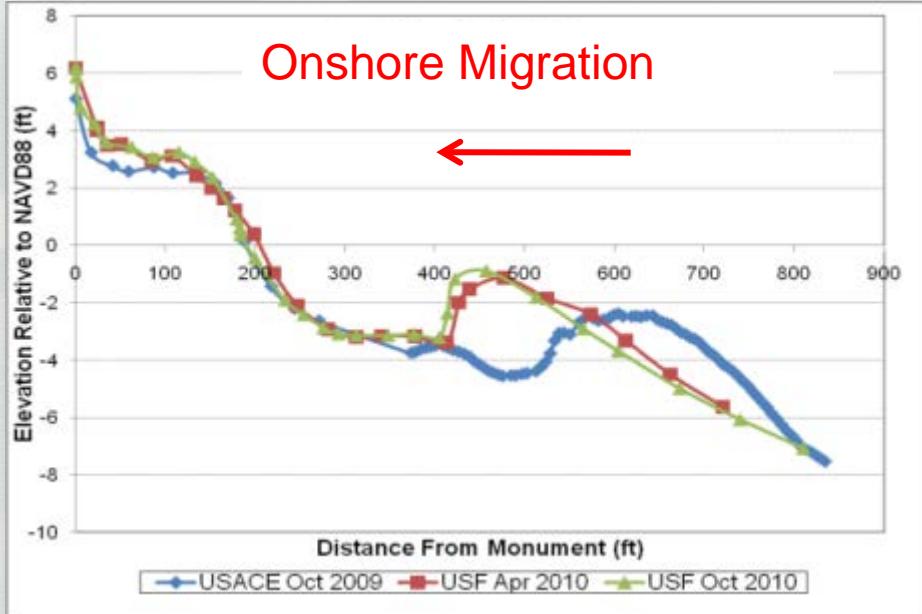
- Geomorphic Properties of Inlets (Hayes Diagram Reform; Ebb Shoal Dimensions)
 - Define areas of influence of inlets
- Berms Online Database
- Nearshore Berm Calculator
- Inlet Reservoir Model (Web Version)

Action 3.2.1 of Navigation Strategic Vision *“Develop an inventory of all federal authorized projects...”*

FY12 Nearshore Berms

Questions

- **Placement Method:**
Pump vs. Hopper Dredge
- **Quantity and Rigor of Design:**
“Dumped” vs. Designed
- **Cross-shore Location:**
Feed sand vs. wave break
- **Alongshore Location:**
Relative to inlet; gaps required?
- **Environmental Concerns:**
Dispersion of fines over habitat



Statements of Need

Design and Evaluation Tool for Nearshore Berm Placement of Non-Beach Compatible Material
Tracking Number 2011-N-15

Nearshore Placement of Dredged Sediment Assessment
Tracking Number 2011-N-19

FY12 Nearshore Berms Products

Ft. Myers Berm (Completed; Final Report Pending)

Sediment dispersion

Bathymetric change and berm migration rates

Pensacola Berm (In Monitoring Phase)

Sediment dispersion

Alongshore migration rates

Pensacola channel infilling rates

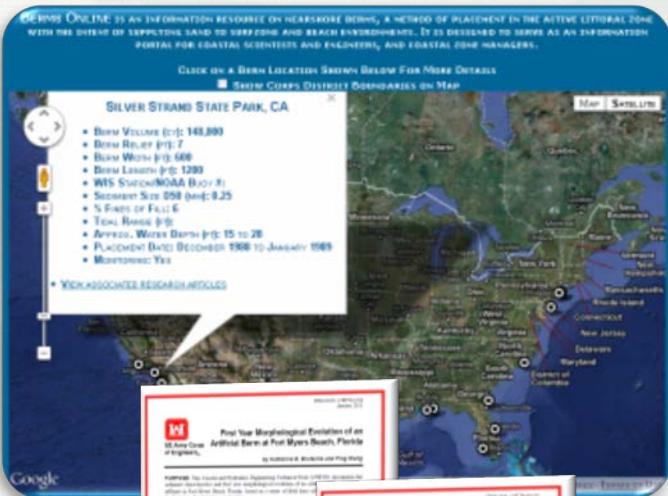
Egmont Berm (In Monitoring Phase)

Pre-project site characterization

Post-placement evolution

Action 3.2.2 of Navigation Strategic Vision
"Establish practices...optimize environmental windows...maximize beneficial use of O&M"

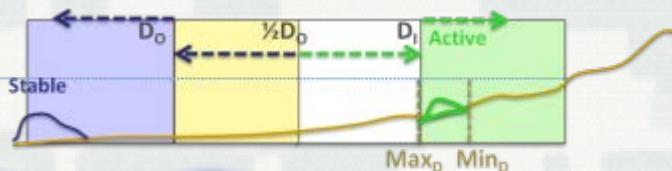
Berms Online: A Nearshore Berm Historical Database



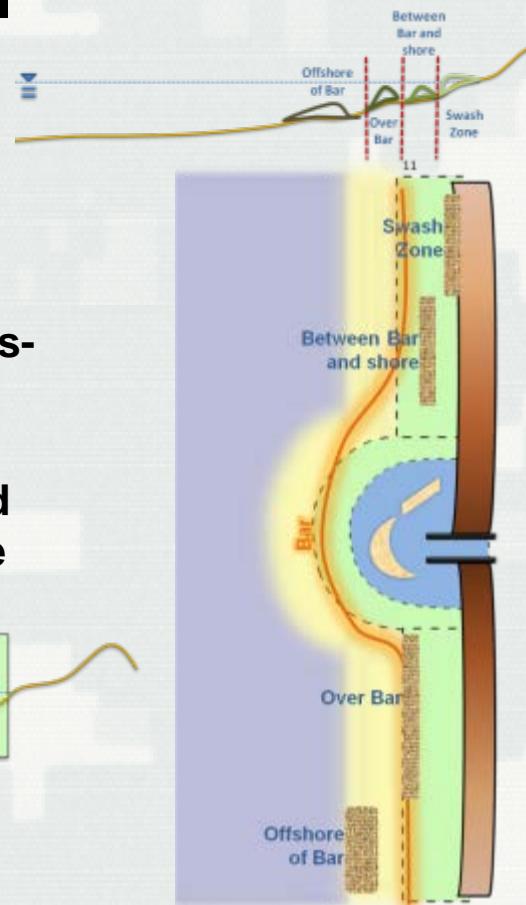
Guideline Development

Simple Planning Calculator Tool

- Developing flexible tools (rapid desk-top to detailed models) for design
- Dredged sediment size(s) and volume
- Placement position in cross-shore, and soon in alongshore
- Site processes represented through empirical formulae



Check out the
Berm Booth!



CIRP Future



CIRP Vision for O&M Decision-Support

Advance R&D in models and tools

cirp.usace.army.mil



Link to existing data and databases

Produce accurate calculations with quantified goodness-of-fit

Roll up calculations to speed interpretation

Examples...

Generate graphical and quantitative output
for decision-support

Speed delivery of results to customers

Channel Portfolio
Tool (CPT),
CPT Smart
Phone
App



Models
and Tools

GenCade

Other
Models
and Tools

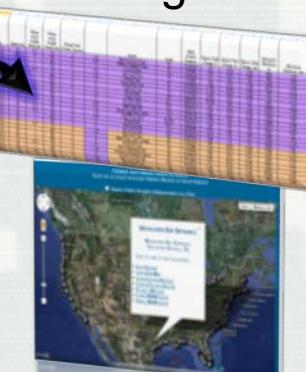


Please let us know if you have more ideas!

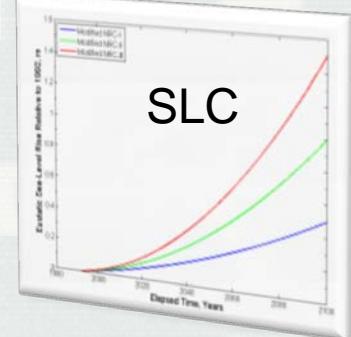
Models
and Tools



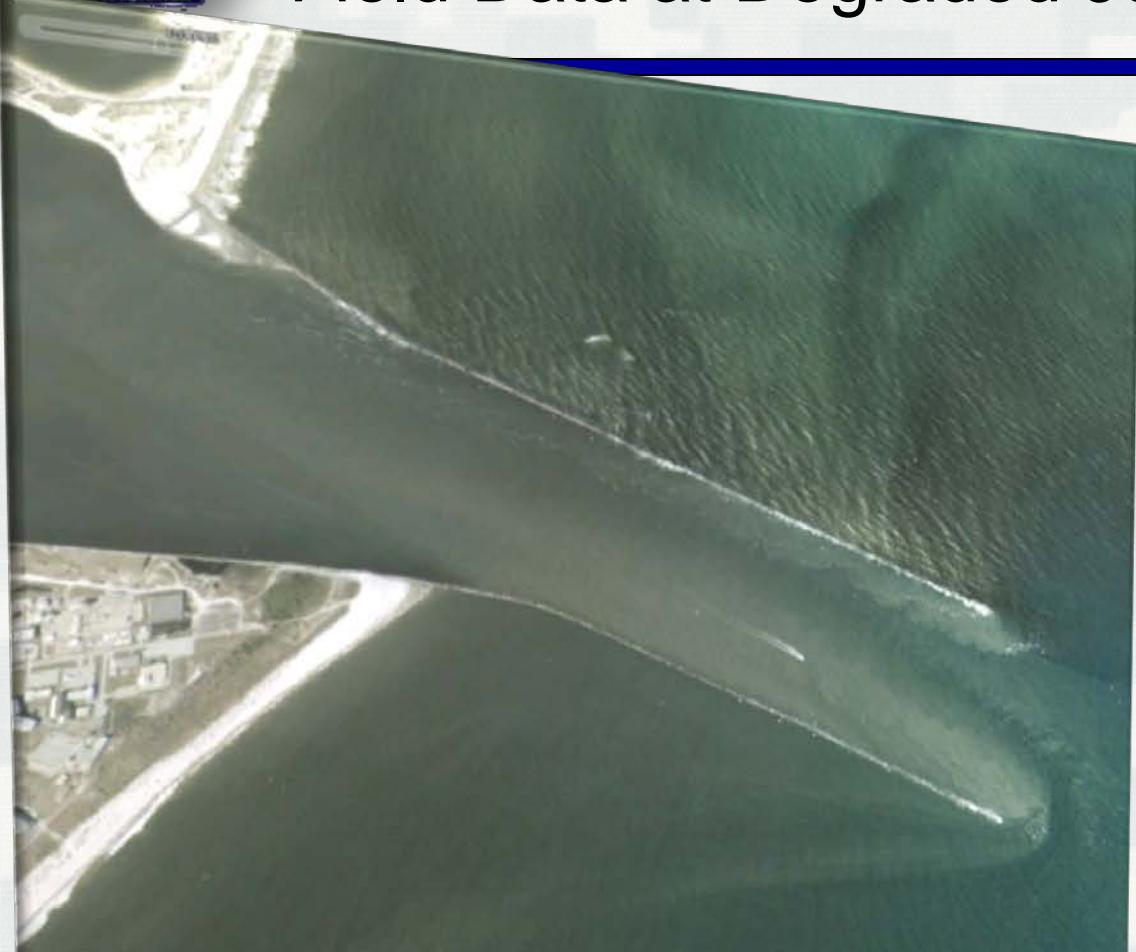
sink Existing Data



GenCade +



Field Data at Degraded Jetty/Breakwater



Statements of Need

Improving Wave Calculations at Coastal and Estuarine Navigation Channels
Tracking Number 2009-N-5

Statements of Need

Automatic Identification System (AIS) data use in Navigation operations and engineering.
Tracking Number 2013-N-5

- Decision-support guidance for rehab given damage rate & SLC
- Many federal structures 50+ years old
- Validate wave overtopping, transmission, and sand transport through rubblemound structures
- Rehabilitation multi-million \$
- Consider archived AIS vessel movement; is wave transmission through jetties creating navigation hazards?

Action 3.2.3 of Navigation Strategic Vision

“Develop science & engineering risk-management approach...to nationally rank reliability of navigation projects”

CIRP Existing and Future SoNs

Presently Addressing 5 SoNs:

Statements of Need

Need long-term morphologic evolution predictors
Tracking Number 2008-N-6

Statements of Need

Design and Evaluation Tool for Nearshore Berm Placement of Non-Beach Compatible Material
Tracking Number 2011-N-15

Nearshore Placement of Dredged Sediment Assessment
Tracking Number 2011-N-19

Statements of Need

Improved Justification for and Prioritization of Annual Maintenance Dredging Investments
Tracking Number 2009-N-8

Statements of Need

Dynamic Web-link and analysis of environmental Database for Coastal Inlet, Harbor, and Estuary Wave Modeling Projects
Tracking Number 2011-N-10

CIRP Existing and Future SoNs

Propose Adding 4 More in FY13 (discuss Thu):

Statements of Need

Identifying and Addressing Potential Sea Level Change Impacts to Navigation Projects
Tracking Number 2013-N-11

Statements of Need

Automatic Identification System (AIS) data use in Navigation operations and engineering.
Tracking Number 2013-N-5

Statements of Need

Automated Feature Extraction for Sediment Budgets
Tracking Number 2013-N-15

Statements of Need

Improving Wave Calculations
Tracking Number 2009-N-5

Thank you!



Ned, Mary Beth, David, and baby John Mitchell